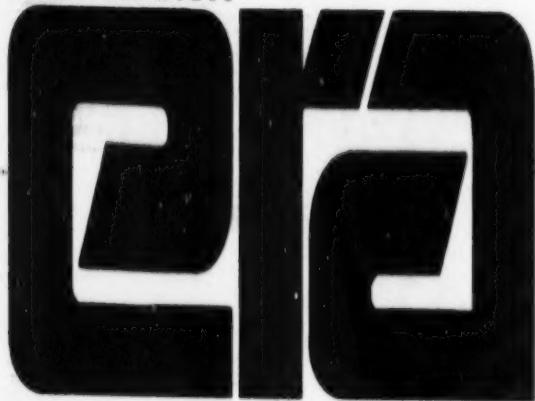


RECLAMATION

A Water Review Quarterly



Winter 1974



RECLAMATION



Kathleen Wood Loveless, Editor

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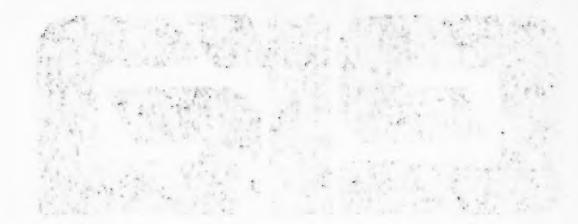
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United States Department of the Interior
Rogers C. B. Morton, Secretary

Bureau of Reclamation
Gilbert G. Stamm, Commissioner

Issued quarterly by the Bureau of Reclamation, United States Department of the Interior, Washington, D.C. 20240. Use of funds for printing this publication approved by the Director Office of Management and Budget, August 14, 1969.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price 75 cents (single copy). Subscription price: \$2.70 per year (70 cents additional for foreign mailing).



*A
Photo
Essay*



New Spawning Grounds for Salmon

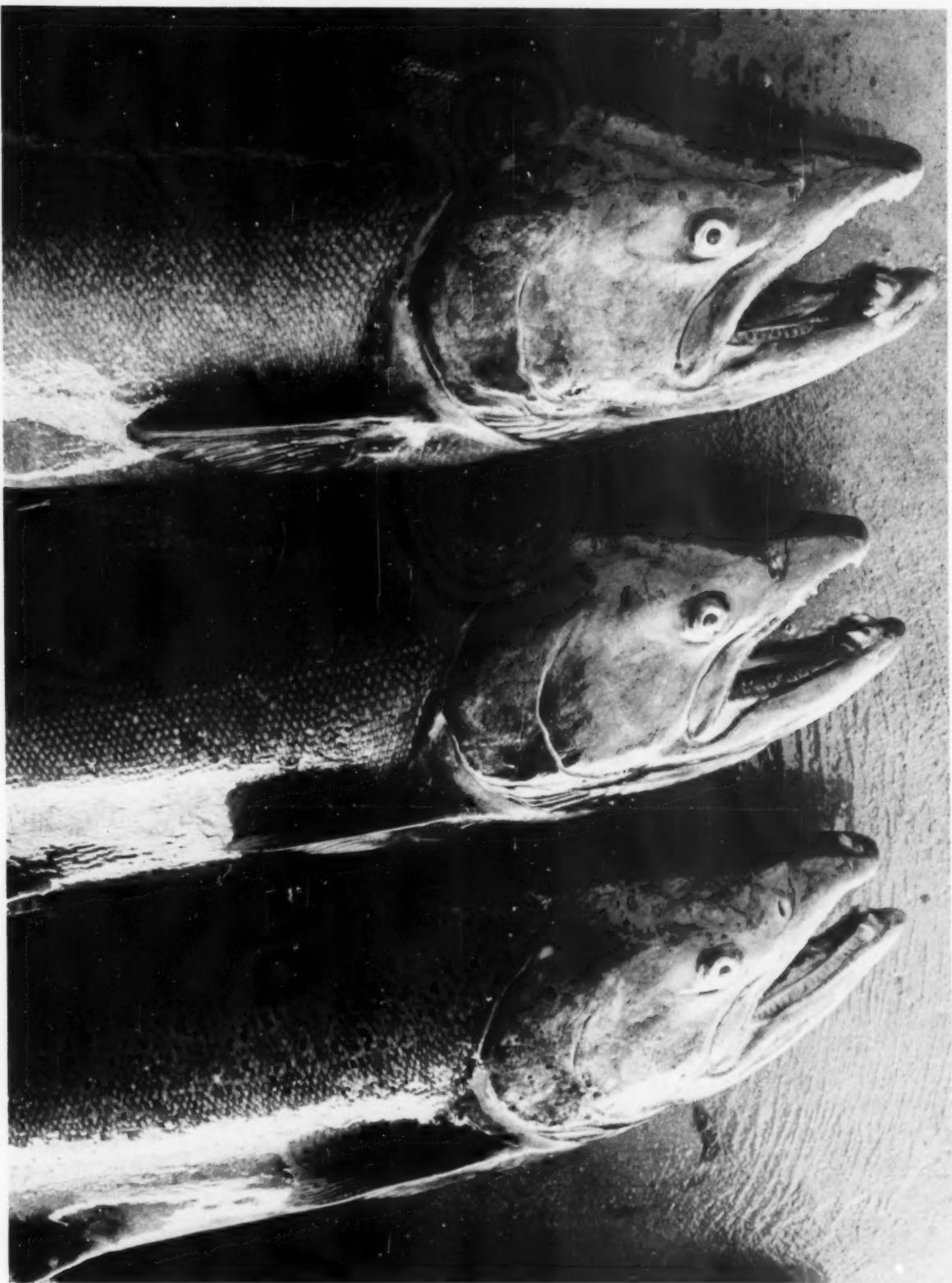
When something is taken away, something should be given in return—so the tradition goes. And that is just what happened at the Bureau of Reclamation's Nimbus Fish Hatchery on the American River just below Folsom Dam, Calif.

At one time the American River provided about 100 miles of streams in which salmon could spawn. When the Folsom-Nimbus project was completed, most of the

spawning area was cut off. So the Nimbus Hatchery was constructed to replace these lost spawning gravels.^①

Since king salmon, like all Pacific salmon are anadromous—that is they spend most of their lives at sea and ascend fresh water streams to spawn—they needed the new fish hatchery to continue spawning.^②





Actual counts are made from a ten ounce measure to get the number of eggs per ounce.®

After the eggs are hatched and while they are still small "swim-up" fingerlings (total length approximately 40 mm), they are marked by removing the adipose fin. The salmon are anesthetized and the fins are removed with surgical forceps. The fingerlings are then deposited in the American River. Since they are marked, fish experts will be able to tell if they return to the hatchery after migrating to the ocean.®

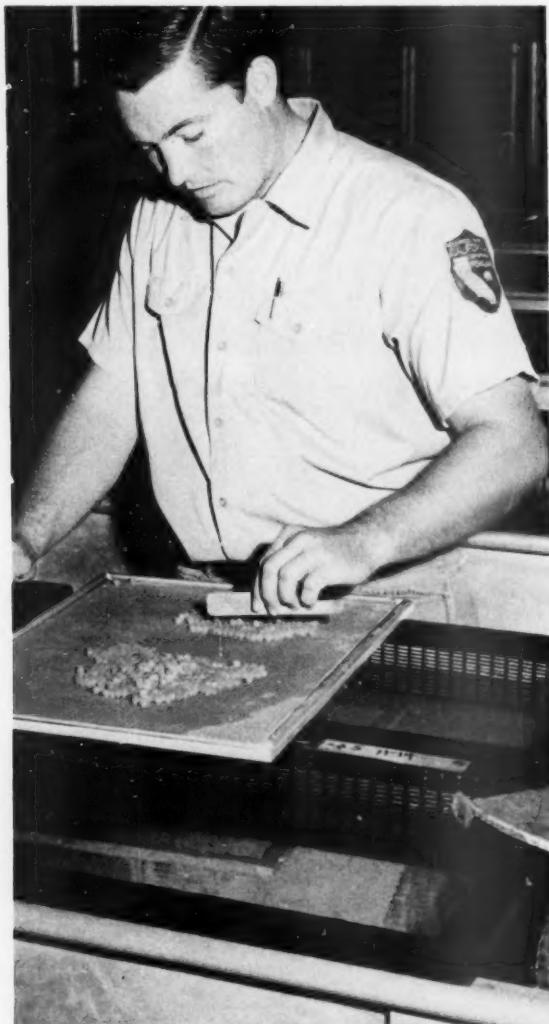
Their life cycle is as follows: in the fall the salmon deposit their eggs in gravel nests and die shortly after. The eggs hatch in 50 to 60 days, and the fry remain in the gravel until the yolk sac is absorbed. They then work their way out of the gravel and start to feed and begin their migration to the ocean. The king salmon spend from two to six years in the ocean (the average

is four years) where they grow rapidly to maturity.)

They then return to the stream where they began their life cycle. How they are able to find their way back to the stream of their birth is one of the wonders of nature. The best scientific evidence to date indicates they may navigate their return trip by a strong sense of smell.

The process of raising salmon in the Nimbus Hatchery has proven to be so successful that the American River is almost overflowing with them.

The capacity of the fish hatchery is 20 million king salmon, but there is hope of expanding the facilities to accommodate 50 million fish. However, this would have to be preceded by a change in legislation. Now, by law, fish from the hatchery may be deposited only in the American River. Hopefully some day these fingerlings may be deposited in other California rivers.



BANKS LAKE

Study Underway

By CAROL PROCHASKA, Administrative Assistant to the Project Manager, Columbia Basin Project Office, Ephrata, Wash.

Fishermen have long known that Banks Lake is inhabited by big fish, but just how many and exactly where they feed and live have been matters of speculation. Now, the answers to these and other questions may soon be known. A group of young scientists from the University of Washington Fisheries Research Institute collected data on many aspects of the Banks Lake fishery.

To Determine Pumping-Generating Effects

The study was commissioned by the Bureau of Reclamation to determine the effects of a pumping-generating operation on Banks Lake and its fish populations. This past summer the Institute's four-man field team collected basic data on the physical and chemical composition of the lake and its fish. These data will be compared with similar data that were obtained after the pumping-generating operation began last fall.

Pump-Turbine Units

The interest in the pumping-generating operation stems from two 67,500-horsepower pump-turbine units installed last fall in the Grand Coulee Dam Pumping Plant. The units pump water for irrigation into Banks Lake, the Columbia Basin project's equalizing reservoir. In addition, they will be used to supply power

during periods of peak demand on the Federal Columbia River Power system. Since peak power requirements usually occur during the coldest months, November through February, and the irrigation season extends only from March through October, the pumping and power generating functions are complementary.

Pumping From Roosevelt Lake

The water used for power production during peak periods will be replaced by water pumped from Franklin D. Roosevelt Lake, behind Grand Coulee Dam. This water will be pumped into Banks Lake when power demands are below peak levels.

With installation of the pumping-generating units, fluctuations of the water level in Banks Lake during a daily pumping-generating cycle could be as much as two-tenths of 1 foot. At certain times, however, it may be desirable to withdraw water from Banks Lake for longer periods or to delay refilling during prolonged peak demand periods until a light-load weekend occurs. Under such circumstances, fluctuations in Banks Lake water levels could amount to as much as 1 foot.

The 2-year study, which began at the end of June, is to investigate several elements: first, the identification and distribution of Banks Lake fish; second, fish movement patterns in Banks Lake and in the exchange between Banks and Roosevelt Lakes; third, the effect of fluctuations in the water level on the food supply



A Ban Doorn bottle is used to obtain water samples for analyzing the chemical and physical properties of Banks Lake. Water samples are very important in obtaining data about Banks Lake.





Gary Thomas and Bill Karp, members of the University of Washington Fisheries Research Institute field team, place a beach net in shallow waters to capture fish needed for the study.

and fish reproduction; fourth, the distribution and effects of thermal and chemical water differentials resulting from the pumpback process; and fifth, the effect of the pumpback operation on fishermen's catch.

Researchers

Dr. R. E. Nakatani and Dr. Q. J. Stober, faculty members of the College of Fisheries at the University of Washington Fisheries Research Institute, are the principal investigators directing the study. Phil Roger, project leader, heads the field crew for the Institute. Graduate students working on the project are Gary Thomas, candidate for the Ph.D. at the University of Washington; and Bill Karp and Hal Beatties, Master's degree candidates.

The research team has established four test stations on Banks Lake. Observations are made and recorded regularly at each station to compile data on existing conditions. Among the tests and records kept are temperature readings from various depths and water samples used to determine chemical composition and the amount and varieties of plankton and other fish food present. Methods used to determine fish population and species present include netting, trapping,

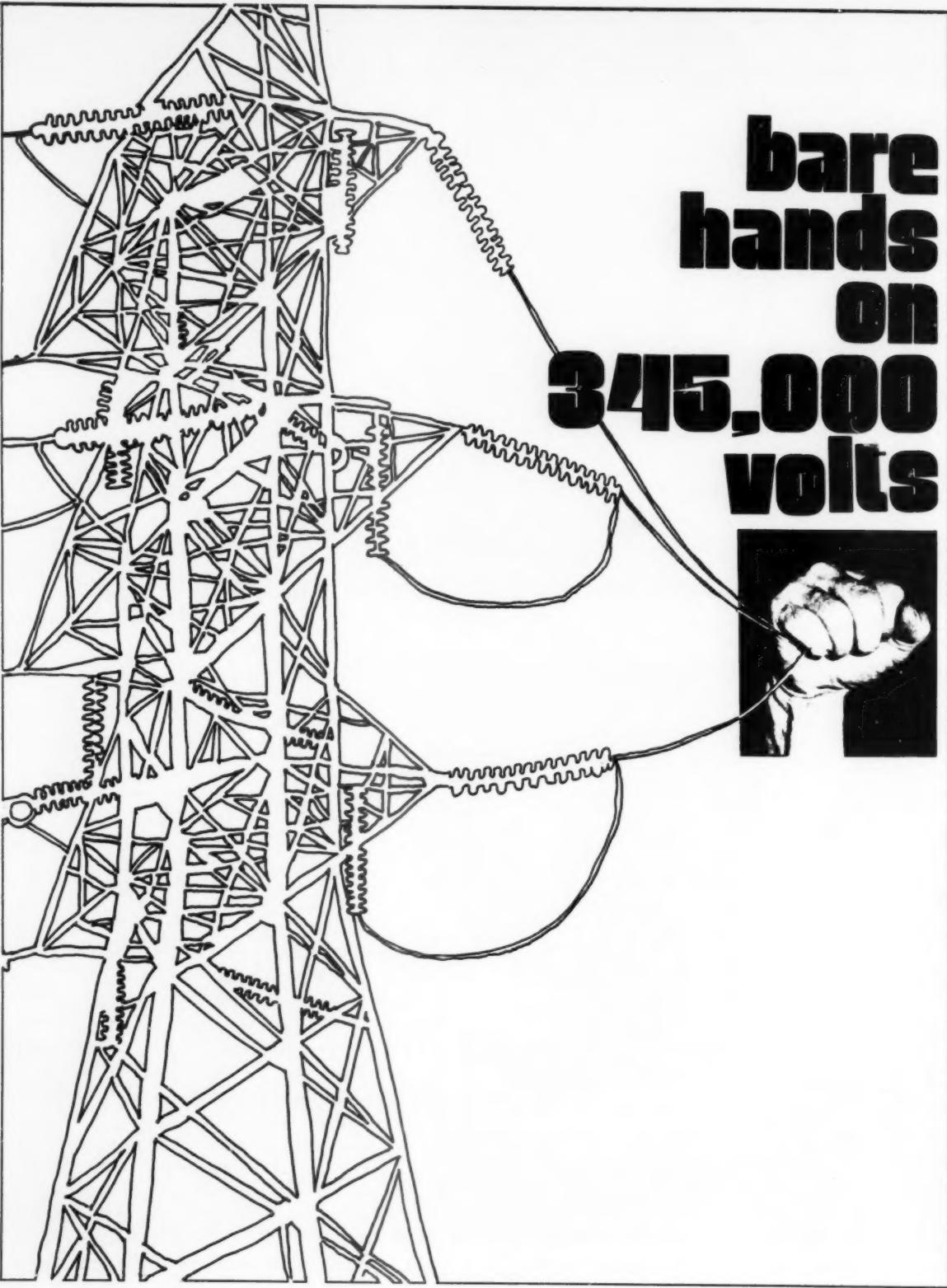
analyzing sonar study print-outs, and counting sportsmen's catches.

Intensive sampling and testing were conducted until September of this year, and will be conducted again from June to September of next year. During the rest of the year, periodic checks will be made to determine composition of the fish community and various aspects of water quality.

Visitors

Banks Lake is popular not only with Northwest residents, but with other visitors as well. Last year people spent an estimated 620,000 visitor-days in various recreational activities on the Lake. The 27-mile-long reservoir is open year-round for fishing and has a reputation for producing good catches of several fish species. The principal fish species caught include rainbow trout, kokanee, ling (burbot), walleye, largemouth bass, yellow perch, and lake whitefish.

Data gathered during the study will be stored, along with other information on State of Washington lakes and streams, in the computerized information bank maintained by the University of Washington. It will provide valuable limnological information on Banks Lake, information that may some day benefit all of us.



**bare
hands
on
345,000
volts**

By GEORGE HENSLEY, Administrative Officer, CRSP Power Operations Office, Montrose, Colo.

How would you like to grab, bare-handed, a metal conductor carrying up to 345,000 volts? Not many people would, even if assured they would not be harmed. Many Bureau of Reclamation linemen touch these high-voltage lines regularly as part of their work. The trick is to do it with the utmost caution and the right equipment.

Transmission Line Maintenance

Each year, transmission line maintenance personnel of the Bureau's Colorado River Storage project (CRSP) Power Operations Office in Montrose, Colo., participate in a Live-Line, Bare-Hand School. Those who have not had previous training in the school must participate in a 2-week course. "Old hands" attend a 1-week refresher course.

Requests to participate are received and honored, if possible, from other Bureau offices, as well as other public and private utilities. This year two participants and one observer from South Africa and three participants and two observers from Mexico attended the school. In addition, representatives from three other Bureau project offices, the Bonneville Power Administration, and the Idaho Power Company participated in the program.

The Live-Line, Bare-Hand technique allows linemen

to repair the lines while energy runs through them without curtailing service to customers. This eliminates the loss of power revenues which, in some instances, amount to as much as \$2,500 an hour. Also, since CRSP is part of an interconnected system, it is difficult to schedule line outages without putting other utilities in some jeopardy. Hence, the importance of uninterrupted service is magnified.

Insulated Boom Trucks

The CRSP Power Operations Office has two insulated boom trucks or "live-line units." A bucket is located on the end of the insulated boom from which the linemen perform their work bare-handed. The Hi-Ranger Live-Line Unit is capable of reaching a height of 95 feet, the Holan reaches 57 feet, and both rotate 360°. The booms have operating controls at ground level and at the bucket.

N. Wayne Jackson, head of the CRSP Power Operations Office Transmission Line Section, conducts the training school and is the author of the written instructions and procedures used for training and operating. According to Jackson, the Bare-Hand technique requires that on 345,000-volt lines, a lineman must wear a special suit and boots that conduct the live wire's current around the worker's body. When

working with a lesser voltage, special suits are not required. In either case, the worker becomes "energized" just as does the live conductor.

Since the insulated boom isolates the lineman from a ground source, the current passing through or around his body is not dangerous. He is at the same degree of electrification as is the energized line. He cannot touch anything grounded or one of the other conductors of the transmission line without receiving the full force of the electricity. Obviously, he has to be extremely careful about what he touches. Jackson contends, however, that the most dangerous thing

the Live-Line, Bare-Hand worker does on the project is driving to work. The risk is taken out of the Bare-Hand procedure with the training school and periodic refresher instruction.

Linemen who successfully complete the course are "certified" as qualified Bare-Hand linemen. Participants from South Africa did not appreciate the term "being certified." In their country, to "certify" someone means to commit him to a mental institution. Probably, if some of us had to do Live-Line, Bare-Hand work, we would fit the South African definition.



These workers depend upon the Hi-Ranger 95-foot Live-Line Bare-Hand Unit to assist in installing the conductor sleeve.



These "buckets," located on the end of the insulated boom, are where the linemen perform their work bare-handed.

Spanish-Speaking Lineman

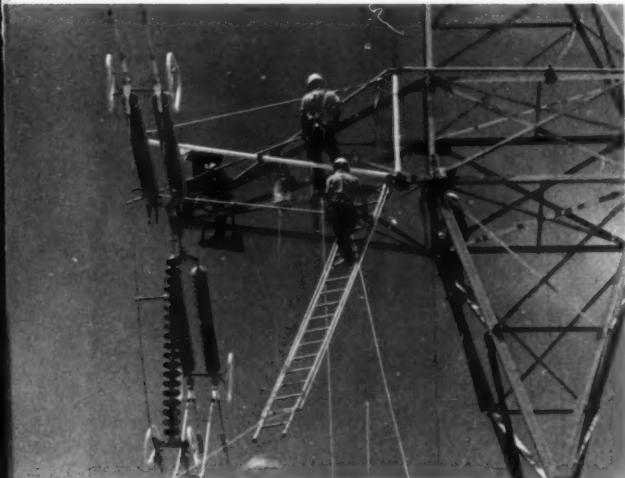
Mexican participants attending the last course spoke no English. They brought an interpreter, but he was a salesman with little technical or craft background. He was therefore unable to interpret or translate the written instructions into Spanish.

Fortunately, foreman Jose (Vince) Blanco, a participant from the Bureau's South Platte River project, was fluent in bilingual craft terminology. Not only could Vince speak Spanish and translate English to Spanish, but he did it in the lineman's vernacular. For

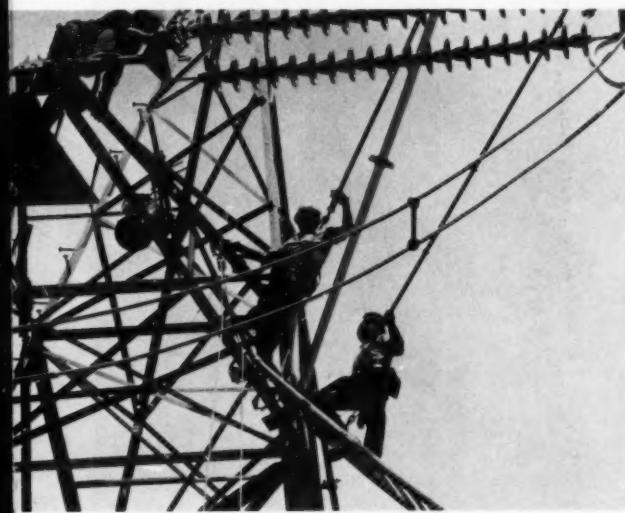
instance, a "bus" to the Mexicans is only a vehicle that transports people. To the American lineman, it also means a main electrical circuit with other circuits branching off it. Vince worked with the Mexican linemen each evening, translating the written instructions into Spanish so they would be prepared for the next day's schooling.

Leader in the Field

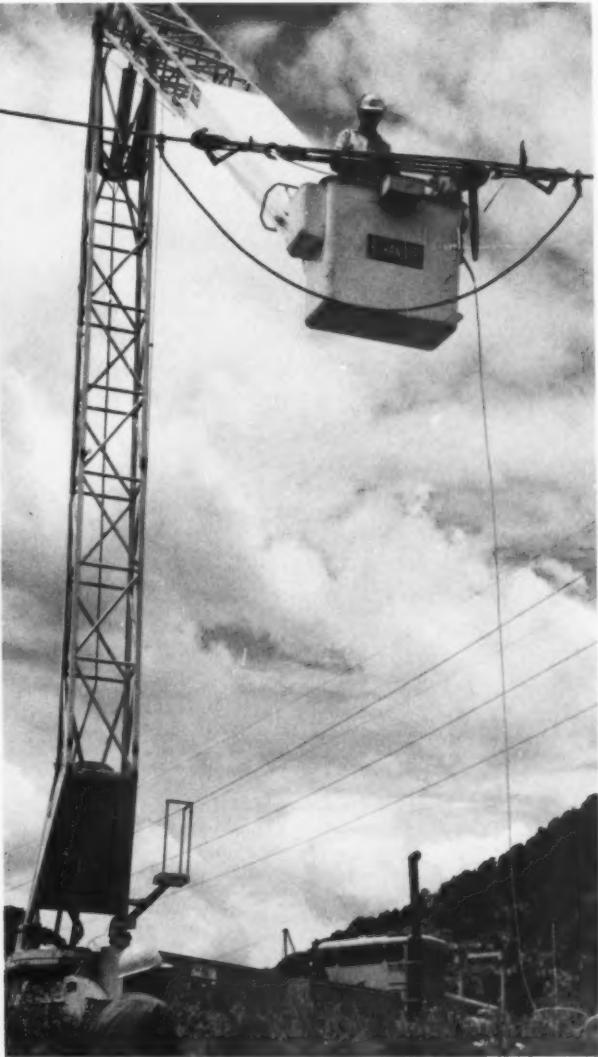
The scope and quality of this Live-Line, Bare-Hand School are unique in the industry. They establish the



Dangerous as this may appear, these men are well trained to perform their work safely.



The Live-Line, Bare-Hand technique allows linemen to repair the lines while energy runs through them without curtailing service to customers.



The Hi-Ranger 95-foot Live-Line, Bare-Hand unit is vital to linemen's performing their tasks.

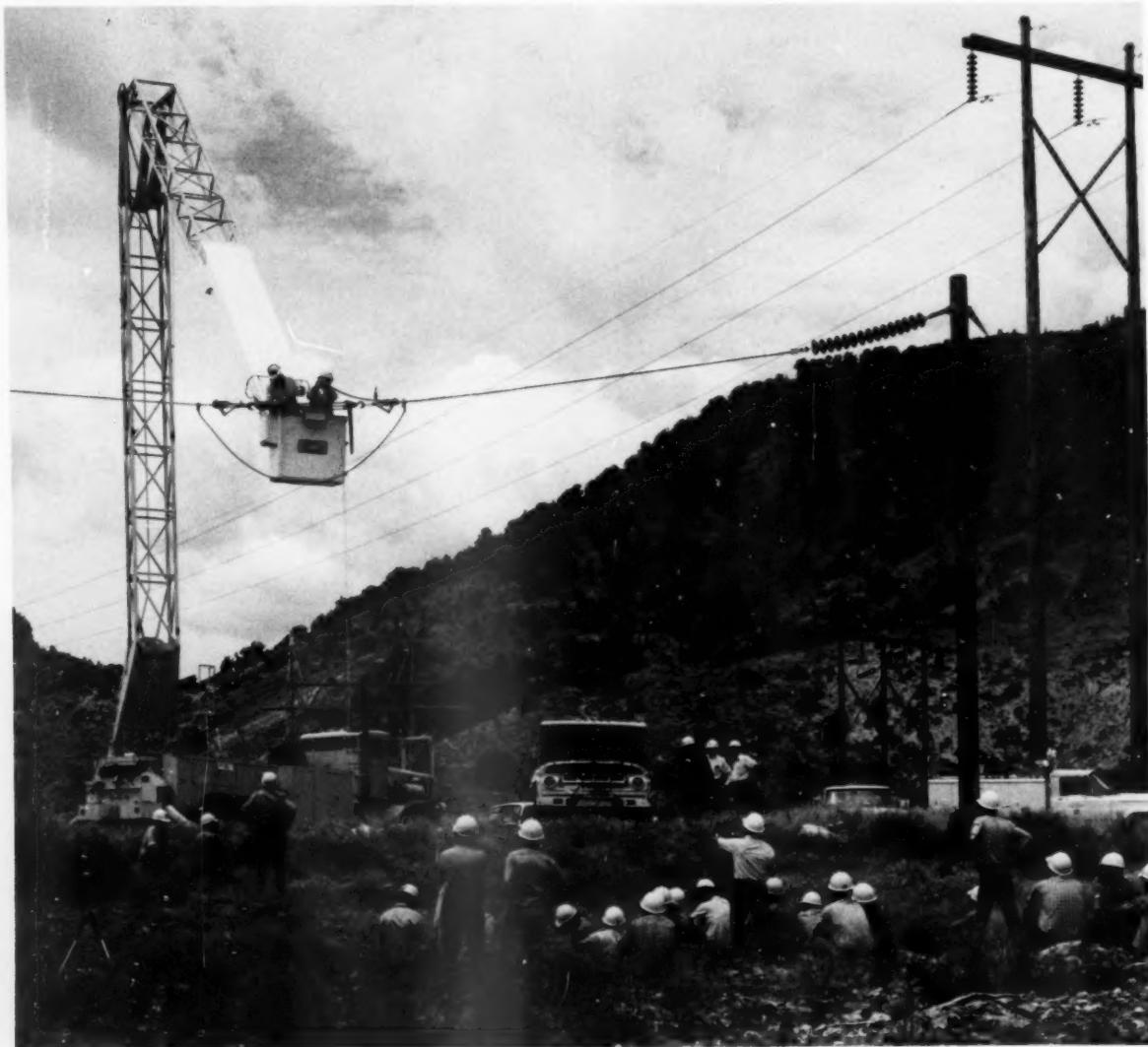
Bureau of Reclamation as a leader in the live-line maintenance field. The school, started in 1969, has graduated 47 qualified Bare-Hand linemen—30 from the CRSP Power Operations Office, 7 from other Bureau of Reclamation project offices, 4 from private utilities, 5 from foreign countries, and 1 from a supplier of line hardware. In addition, about an equal number have taken refresher training during this period.

Each class, including those linemen taking the course for "certification" or "refresher" training, consists of

about 25 participants and observers. Any person who touches the line under controlled supervision receives a certificate of membership in the Live-Line, Bare-Hand Club, which has a membership of over 300. Many letters have been received by the CRSP Power Operations Office from companies supplying line hardware, foreign companies, and private utilities attesting to the high regard in which they hold this training.

Next time you see a bird light on a high voltage line and fly away unharmed, think of the Bare-Hand linemen who keep the power flowing.

Here, linemen are installing a conductor sleeve under energized conditions by the Live-Line, Bare-Hand technique.



YESTERDAY IN OUR MAGAZINE

THE RECLAMATION ERA—1958

Highway in the Sky

In the high plateau desert near the Arizona-Utah border, men and machines matched their skills and energies against the forces of nature to build the world's highest bridge.

Over the muddy streak of the Colorado River far below, two half arches of steel project out from the 700-foot vertical cliffs of pink sandstone. This was the start of the Glen Canyon Bridge which will someday be a crossing point of Highway 89, a major thoroughfare spanning the southwestern part of the United States.

Against the vastness of this canyon, the spider webs of steel slowly arched toward their closure point midway between the 1,028-foot gap. When that closure was made on August 6, 1958, it was a day of great rejoicing for the bridge workers. . . .

Some 4,000 tons of structural steel will eventually go into this bridge which, when completed, will provide a 30-foot roadway across the canyon.

Although under separate contract, the bridge is an integral part of the multi-million-dollar dam which will be located upstream from the bridge.

Before any steel work could be accomplished on the bridge, the contractor had the task of setting up a camp site and building access roads into a wilderness area. After constructing the barracks and mess hall on the west side of the canyon, Kiewit-Judson Pacific-Murphy took on the problem of transporting men and equipment across the 1,028-foot chasm that separated the east and west sides of the river. They soon had a 1,500-foot cableway in operation across the canyon. Running from a 100-foot tower on the right bank to a 110-foot tower on the left bank, the 2-inch track strand had a load capacity of 12½ tons.

A second and heavier 25-ton capacity highline cableway was erected to aid the steel erection of the arch span. The head tower of this highline, which is located on the left bank or west side, is 165 feet high and the tail tower on the right bank or east side is 150 feet high. . . .

Bridge building is at best difficult work, for bridges seem to find their reason for existence in hazardous and inaccessible regions. However, the compensation for this work comes in the thrill of the acceptance of the challenge and the ultimate conquest of the obstacles invariably presented by nature.

This bridge was no exception. The challenge was accepted!



Glen Canyon Bridge during construction.

WATER QUIZ

1. What is the geologic term used to explain the movement which occurs when boulders are moved downhill by natural processes, such as the alternate freezing and thawing of ground? [The original position of the boulder is shown in grey. When water in the topsoil freezes, it expands, raising the surface and everything on it, including the boulder (dotted boulder). During the spring thaw, the ground melts lowering the rock. But, instead of returning to the same spot, the boulder slides downhill to a new position (solid line).]

2. Why are a positive and a negative terminal necessary to change salt water to fresh water?

3. Many people believe limestone caves are a major source of groundwater. Actually, pools or rivers in these cavernous formations represent only about _____ percent of the total groundwater reserves of the earth.

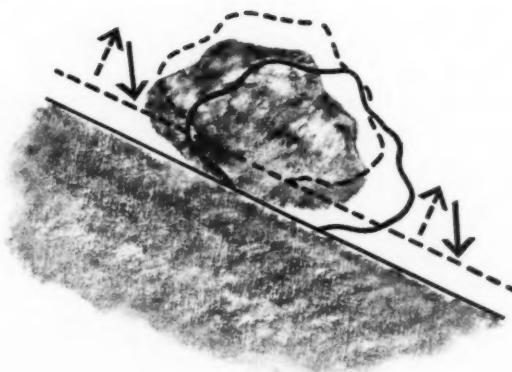
- a. 25 percent
- b. 17 percent
- c. 5 percent
- d. 1 percent

4. Animals, unlike plants, must maintain fairly consistent percentages of water in their bodies to live. Place the following animals in order of percentage, lowest to highest, of the amount of water in their bodies.

- a. earthworm
- b. chicken
- c. herring
- d. lobster
- e. jellyfish

5. Why couldn't the gardens of Nineveh in the seventh century B.C. be irrigated with water from the Tigris River which ran right past the city? What was the solution to this problem?

Answers on page 24.



TODAY

RECLAMATION ERA—1973

Should Page Be Weaned?

Not only was the challenge accepted to build the Glen Canyon Bridge, but also the Glen Canyon Dam. In the process of building these structures, small camps were constructed to accommodate the construction workers.

An example of these camps is Page, Ariz. Built in 1957 with Federal money as a home for the workers of Glen Canyon Dam, the town grew quickly. Sixteen years after its beginning, Page has blossomed into a prosperous community of 8,500 and it will take an act of Congress to end Federal subsidies to the town.

Glen Canyon Dam has long since been completed, Lake Powell now backs up for miles into southern Utah, and the original construction workers are long gone.

Since Page was founded, the Bureau of Reclamation has operated city services. Federal employees maintain water services, collect the trash, and keep the sewer. Federal workers are even sheriff's deputies.

And as a result, the Federal Government had to pick up a \$310,000 deficit last year to keep the city operating.

But now the Government wants to be relieved of its duties. The town's unofficial advisory council also wants the Federal Government out. In 1972 Reps. Morris Udall of Arizona and Sam Steiger of Arizona introduced legislation which would turn over Federal land and services to the town, allowing it to incorporate under Arizona law.

But even if Congress did pass a bill allowing the Federal Government to pull out, Page residents still would have to vote for incorporation. And some believe many residents are reluctant to change because they have been there so long.

This may be the case inspite of the fact that Page residents pay healthy fees for Federal services. For example, the property tax rate of \$2.52 per \$100 assessed value. And because Page isn't incorporated, the town does not receive any revenue-sharing funds.

Back in 1957 when construction workers came to work on Glen Canyon Dam, isolation was a major complaint among workers because Page was 135 miles from Flagstaff, Ariz., and 161 miles from Cedar City, Utah.

By 1961, the community had grown to 6,500 because of the construction project. Nearly 900 trailer homes composed much of the residential section. Today there are more permanent buildings, which indicates the town is here to stay.

But still the problems of control and financing lurk in the minds of residents, Congressmen, and the Federal Government.



Glen Canyon Dam, Bridge, and Visitor Center.



Explorer Post 87

By WILBUR W. BANNER, National Resource Specialist and LARRY ZAKRAJSEK, Engineering Section, Fryingpan-Arkansas project, Pueblo, Colo.

A Conservation Exploring Program is not a scouting program. And a participant does not hunt for arrowheads or tie fancy knots. A participant *does* learn about wildlife management, wildlife habitat improvement, and park development.

Because these areas were of concern to the Bureau of Reclamation and the U.S. Forest Service, they sponsored a Conservation Explorer Post in Pueblo, Colo. Part of the Fryingpan-Arkansas project, this post began 2 years ago and has served the youth of the community ever since.

Exploring Program Goals

The main goal of the Exploring Program is to help young men and women find areas of interest that may lead to careers. The nationwide program, sponsored by the Boy Scouts of America, is designed to allow today's junior and high school students to become more actively involved in projects that interest them. Unlike scouting, an Explorer Post is centered around the self-discipline and individual drive of each student to plan his or her own activities.

Explorer Post 87 gives its 22 members an opportunity to relate to the field of conservation. This is achieved while the activities are concentrated on learning-while-doing. The Bureau of Reclamation and Forest Service support these goals by offering Explorer Post 87 their facilities and personnel.

Developing Projects

These young men and women are charged with the responsibility of developing projects that will satisfy their curiosity about conservation and enable them to obtain new insights. Adult advisors offer suggestions and help whenever students request aid or advice, but they rarely interfere with the development of a student's activities.

The post learned by its mistakes and soon became a smooth-operating organization. Youthful elected post officers conducted meetings, sorted out priorities and solved logistic problems, all of which contributed to accomplishment of post goals.

Wildlife Management

Some students were interested in wildlife management. They planned projects aimed at understanding management responsibilities of agencies such as the



Explorers drive trapped waterfowl into smaller "handling cages" prior to banding each duck.

Colorado Division of Wildlife and the U.S. Bureau of Sport Fisheries and Wildlife. Personnel of both agencies were invited to lecture on techniques used to determine populations of various waterfowl and bird species.

After the students were introduced to the theories behind duck banding and turkey counting, trips were planned by the Explorers so they could participate in both activities.

Waterfowl Banding

The students' excitement was apparent on the mornings of the field trips. They found it rewarding to par-

ticipate in the duck-banding programs. Duck banding involves placing tags or bands on the legs of ducks. This provides valuable data on waterfowl distribution and the longevity of individual duck species. This information is useful to the overall international waterfowl management program. Approximately 100 ducks were banded on that first cold, crisp morning.

In addition, several days were spent observing turkeys to learn their habits. The Explorers learned the importance of wildlife survey programs and gained valuable experiences by actually banding wild ducks and counting turkeys in their natural setting.

Habitat Improvement

Another group of students became interested in range conservation and the importance of native wildlife habitat improvement in the Pueblo area. The Explorers developed two projects that gave them the opportunity to learn theories and practices used in range conservation programs while actually improving wildlife habitat.

The local Pueblo Soil Conservation Office helped students secure a rangeland on a ranch near Pueblo. Here, native grass cover could be improved and supplemented by planting trees and shrubs. Personnel from the Soil Conservation Service Office in Pueblo aided

students in determining the types of conservation techniques and vegetation that would provide the best results.

The Explorers learned to cooperate with farmers in working out a mutually acceptable site development plan. Students gained experience in tree-planting by planting nearly a thousand Russian olive, honey locust, and sumac.

Constructing natural log bird houses in a local city park was another phase of the habitat improvement program. The design was developed to keep material costs to a minimum and to create a finished product that would blend with the natural setting.



Doug Nesslage and Patty Jones plant the first tree of 1,000 planted by Conservation Explorer Post 87.



This is the area where the Fountain Park site will be developed by the City of Pueblo with the assistance of Explorer Post 87.



One of the problem "dump" areas encountered during the development of the park on Fountain River.

Park Development

The largest and most challenging project undertaken by the post was development of a plan for a 6.5-acre park. The park would be on the Fountain River flood plain in the city of Pueblo. Explorers undertook the project, known as the "Fountain Park project," to learn how conservation and recreation planning were related.

Personnel from the Regional Zoning and Planning Commission, the Forest Service, and the Bureau of Reclamation assisted the students in developing the initial layout. Post members learned about the relationships among nature, conservation, and park construction and they were introduced to the complexities of recreational planning.

How can a group of explorers, untrained in design and planning and without financing, actually get a project of this magnitude started? A positive attitude, patience, and hard work are some of the keys.

To date, the city has acquired the land where the park will be located, a survey of the topography has been completed, several designs have been made, and the proposal has been submitted to the Fountain-Arkansas Commission for consideration.

In Summary

The Conservation Exploration Program gives students a chance to become aware of their environment and to work at improving it. Much credit is due to the Exploring Division of the Boy Scouts of America, the post sponsors and advisors, interested Federal agencies, and most of all, the explorers who made it all happen.

news NOTE

Ed Sullivan Named Assistant Commissioner

Edwin F. Sullivan was promoted and transferred from Boise, Idaho, to be the Bureau's new Assistant Commissioner for Resource Management in the Washington Office.

Sullivan had been Regional Director of the Pacific Northwest Region since September 1971. His appointment as Assistant Commissioner was effective September 30.

"It is unusual for one man to have distinguished himself in so many areas vital to water resource development," Commissioner Gilbert G. Stamm said. "Ed Sullivan's broad experience ranges from administration of Reclamation's planning, construction, operation, and maintenance of facilities to personal contacts and exchanges with water and power users and members of Congress. This competence will now be brought to bear at the national level on the total Bureau of Reclamation program."

Sullivan became Regional Director in Boise after serving as Assistant Regional Director for the Mid-Pacific Region, headquartered in Sacramento, Calif.

He is a registered civil engineer and a Fellow in the American Society of Civil Engineers. He is also a member of the International Commission on Irrigation, Drainage, and Flood Control; the U.S. Committee on Large Dams; and the American Water Resources Association.

Mr. Sullivan is married to the former Josephine Paulson of Pasadena, Calif. They have four grown children, Caroline, Edwin, Walter, and Louise.

Rodney J. Vissia Appointed Pacific Northwest Regional Director

Rodney J. Vissia was appointed Regional Director of the Bureau's Pacific Northwest Region, with headquarters in Boise, Idaho.

For the past 3 years, Vissia had been the Regional Planning Officer in the Bureau's Mid-Pacific Region.

Since 1963 he had been involved in project planning in the Sacramento office, where more than \$2 billion worth of projects had been developed in the past 10 years.

Vissia replaced Edwin F. Sullivan, who was Regional Director in Boise. Vissia's appointment was effective September 30.

"The Bureau and the Region are fortunate in having a man of Rod Vissia's experience and ability available to step into so important a position," said Commissioner Stamm. "Rod's training and experience in the Mid-Pacific Region, which has been one of the most active Regions in the Bureau over the past 10 years, have prepared him well to take on the responsibility of Regional Director."

In September 1972, Vissia visited the Soviet Union as a member of a United States exchange team to review Soviet irrigation planning, operating, and construction techniques.

He is a member of the American Society of Civil Engineers and has been active in Little League as a coach and manager.

He is married to the former Julie Brown of Doon, Iowa. They have two children, Randall, 15, and Gregory, 10.

Soviet Team Visited Reclamation Projects

Last November a team of four Soviet engineers completed a 32-day tour of the United States. The tour objective was to see the large precast, prestressed concrete pipe used in water and land developments.

The Soviet team, with an Embassy official and representatives of the Ameron Corporation (an American firm making unusually large concrete pipe) visited among other sites, four Bureau of Reclamation projects. They included the Columbia Basin project, Wash.; the Central Valley project, Calif.; the Navajo Indian Irrigation project, N. Mex.; and the Bureau's Engineering and Research Center in Denver, Colo.

Various Ameron officials joined the tour as it progressed. Ameron financed the tour. Later, the Soviets will host a tour of Russian projects for an Ameron team. The arrangement is part of an exchange proposed by the Soviet Minister of Land Reclamation and Ameron.

Val Killin Retires

Val Killin, Assistant Regional Director, Lower Missouri Region, retired last October. Mr. Killin was formerly in the Washington Office serving as Chief, Division of Foreign Activities. He accepted the position of Executive Director, Colorado Water Congress in Denver.

Resolving Colorado River Salinity

The Department of the Interior is ready to implement the international agreement entered into August 30, 1973 by Mexico and the United States to provide lasting benefits for water users on both sides of the International Boundary.

Referring to the document signed in Mexico City, Secretary Rogers C. B. Morton said that the United States had agreed to improve the quality of Colorado River water which the United States delivers to Mexico at Morelos Dam.

"The Department has been studying solutions to the problem for many years," Morton said, "and we intensified our search for the answers when President Nixon assigned former Attorney General Herbert Brownell to negotiate an agreement with our friends south of the Border."

The agreement specifies that water delivered to Mexico upstream of Morelos Dam (approximately 1,360,000 acre-feet annually) should have an annual average salinity of no more than 115 parts per million (p/m) plus or minus 30 p/m over the annual average salinity of Colorado River waters arriving at Imperial Dam, Calif.

The main item in the proposed solution is the construction of the world's largest desalting plant, which will treat the return flows from the Wellton-Mohawk Irrigation and Drainage District.

This plant, using either the reverse osmosis or electrodialysis process, will have the capacity to produce 100 million gallons per day of desalinated water with a salinity of about 240 p/m. By blending the product water from that plant with the untreated Wellton-Mohawk return flows and by discharging the mixed product into the river above Morelos Dam, the United States will be able to meet its obligation under the agreement.

Robert McPhail Becomes Upper Missouri Regional Director

Robert L. McPhail was selected to be Regional Director of the Bureau of Reclamation's Upper Missouri Region, headquartered in Billings, Mont.

McPhail has been Program Manager of the Department of the Interior's Northern Great Plains Resource Program since June of last year and has had more than 10 years in the Department of the Interior, including 8 years in Reclamation. He replaces Harold E. Aldrich who retired as Regional Director in Billings last June.

"With his broad career background in Reclamation and more recently in special assignments for the Department, Bob McPhail is well qualified to step into this position," Commissioner Gilbert G. Stamm said. "Bob is sensitive and responsive to the ideas and needs of both local and national interest, and he will play a major role in our continuing adjustment of the Reclamation program to a dynamic economy."

In June 1973, McPhail completed an assignment as Study Manager of the Southwest Energy Study, which was a broad interagency, interdisciplinary effort established by Secretary of the Interior Rogers C. B. Morton in May 1971 to evaluate the cultural, social, economic, and environmental impacts of coal-fired powerplants in the southwest United States.

Answers to Water Quiz

1. *Geological creep.*

2. *A negative and a positive terminal are necessary in electrodialysis because when salt dissolves in water it separates into electrically charged particles (ions) of sodium and chlorine. The sodium ions, which carry a positive charge, cluster around the negative terminal while the negatively charged chlorine ions are attracted to the positive terminal. Once the particles are completely divided between the two terminals, the water will be salt free.*

3. *c, 5%.*

4. *Herring, 67%; chicken, 74%; lobster, 79%; earthworm 80%; jellyfish, 95%.*

5. *The river's flow was too uneven, so the ruler, Sennacherib, ordered construction of an extensive system of canals and aqueducts to carry water from the mountains.*



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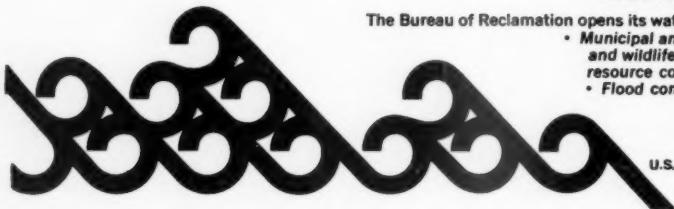
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Issued quarterly, the RECLAMATION ERA is the official publication of the Bureau of Reclamation, U.S. Department of the Interior.



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